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AN ANALYSIS OF POTENTIAL PETROLEUM DEVELOPMENT IN MASSACHUSETTS

prepared by
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This analysis is a rough attempt to look at the cost/benefits of Massachusetts' developing an infrastructure to accommodate petroleum development. Despite a brief look at deep-water ports, refineries, and offshore pipelines and receiving stations, the major emphasis of this analysis is on the potential onshore support industries for offshore exploration and development. It is our belief that the development of support industries will begin within one year and will necessitate land use and economic policy decisions by the Commonwealth very shortly. Our analysis of the economics does not favor refining, pipeline, or receiving station construction until oil is found on the Georges Bank, and thus decisions on these facilities are not urgent.

Before beginning, we would like to make five significant observations which we believe to be valid.

1) The need for planning is immediate if we are to seek and manage the location of OCS support industries in Massachusetts.

2) The development of oil from the Georges Bank will have only a small economic impact on the total Massachusetts economy, but it could have a substantial economic impact on those areas in which the onshore facilities are located.

3) The discovery and production of natural gas could have a beneficial impact on the supply and price of energy to New England--if, and only if, natural gas is not de-regulated.

4) In selecting sites for onshore facilities, the industry will most likely take options out on considerably more land than they need for the exploration stage in order to be in a

position to rapidly expand their facilities to accommodate production.

5) There remains a strong need for regional coordination and cooperation, not only to seek Congressional changes in the leasing system, but also to minimize competition between the states for onshore facilities. The more the New England states compete, the greater their net economic loss, and therefore the greater net economic benefit accruing to the oil and gas companies.

The numbers we have used in this analysis are our best estimates and represent an extrapolation from several studies, including the recently completed NERCOM effort.

DEEP-WATER PORTS

Construction time for a deep-water port would take two years. It would employ (direct, indirect, and induced) 1000 people, 60% of which would come from outside New England, at an annual payroll of $16 million. Population increase would be approximately 1000 people. After construction, operation would require a small amount of manpower.

Deep-water port development for the entire region, however, has become a tabled issue for the moment. For various reasons, locations for such a port are very limited. Furthermore, without a nearby refinery, this port is not economically practical, for super tankers carry crude oil and not refined products.

REFINERIES

Construction time for a 250,000 barrel per day refinery is 3-4 years. The initial capital investment is large, about $400 million. Such a facility would employ about 3,000 people (direct, indirect, and induced) in the construction stage. During operations, direct employment would number 400, with total employment at 1500. Land requirements are approximately 500 acres, with an additional 500 for a buffer zone. (Acreage varies with the type of refinery.)

Little, Inc., has stated that there are only four rivers in New England which could supply the fresh water demand. The Merrimack, north of Boston, is the only one in this state. A large refinery would require four million gallons daily and would necessitate a well-flushed area for large amounts of wastewater discharge.

The major cost would be to the aesthetics of a local community. Pollution control technology has taken care of most environmental hazards with the one notable exception of hydrocarbon emissions into the air. To the best of our knowledge, no refinery in the country meets all the air pollution standards.

The major benefit would be the possibility of substantial local tax revenues. (We are in the finishing stages of a report concerning taxes and petroleum development in Massachusetts.)

There are many reasons, however, why a refinery in New England will probably not be built for at least three to five years. Massachusetts is at the mercy of national and international forces with regard to prices and distribution. Building a refinery here will do very little to lower prices or change distribution patterns. Only changes in OPEC policy can make such changes.

For construction to be justified prior to the development of the Georges Bank, both in terms of cost and supply, it would be desirable to have no future embargoes, the end of price controls, and a guaranteed crude supply under an entitlement program.

The majors will probably not locate here because of costs and would rather expand existing facilities in the mid-Atlantic or Gulf regions. They also want to produce gasoline, while we desire distillate and residual fuel.

Should a significant discovery be made on the Georges Bank, then the increased security of supply resulting from a "close" crude source enhances the economics of refinery development. New England consumes 1.2 million barrels a day, and if top OCS production is about 500,000, we are talking about two refineries for the region. Therefore, if we are to seek a refinery, we should look towards the independents such as Gibbs or Northeast, and we should ascertain that they are investing with New England's (especially Massachusetts') money.

In summation, a refinery is not a very economic venture unless you have a secure source of crude oil. The only way New England can obtain such a source is through a Georges Bank find. If oil is found, the major oil companies will probably still not want to locate a refinery here, instead they will prefer to ship or pipe the crude oil to their existing refineries in

New Jersey. Only the local independents will have an incentive to construct a refinery in New England, and there is some question as to whether they can outbid the majors for the leases on Georges Bank. (A more detailed analysis of refinery economics was prepared by the Energy Office last year and will be made available on request.)

PIPELINES

If there is a large find on the Georges Bank (a few billion barrels of oil or a gas equivalent), then we can probably expect the petroleum to be piped to shore. In this regard, the oil companies would search for the closest landfall possible, because laying pipe underwater is approximately $2-$3 million a mile, or twice the cost of laying it on land. However, oil could be shipped directly from the field to the mid-Atlantic if the political/economic climate is adverse in New England.

For safety and cost reasons, a gas find would almost assuredly necessitate piping to shore to a single landfall site. A coastal receiving facility would be needed to process the gas and would have to be located very close to the landfall site. Oil could be piped inland.

Construction time for a pipeline is about two years; generating about 1000 jobs (direct, indirect, and induced), with an annual payroll of $18 million. Forty-five percent of its jobs would be filled by local residents, and new population (temporary) would be about 1000 during construction. During operation, 70 percent of the jobs would be held by present residents, but only 225 jobs would exist, at wages of $2.7 million in 1974 dollars. Increased population would be minimal. Construction would begin about one year after oil or gas is found. Tax revenues and municipal service costs would both be small. However, an oil spill hazard becomes present where the landfall is sited. Impacts would obviously be localized. Clearly, there will be no pipeline construction until economically producible quantities of oil and gas are found.

ONSHORE SUPPORT INDUSTRY FOR OCS EXPLORATION AND PRODUCTION

It is this area that we believe offers the most short-range benefit for Massachusetts, and for this reason this memo will now turn exclusively towards the siting of OCS support industries and the issues that must be confronted.

We know that exploration for petroleum on the Georges Banks (an area of submerged land off New England, approximately the size of New England minus Maine in acreage) will begin early in 1977. This effort will require a logistical support industry, whose own development will begin to become visible somewhere along the New England coast by the first half of 1976. This exploration effort will occur in stages for the next 3-5 years, before any offshore production begins.

Given that this development is imminent, the major question for state officials is: How do we maximize the potential benefits and minimize the adverse impacts? Unlike other larger coastal states adjacent to offshore development, such as California and Texas, Massachusetts lies in close geographic concert with neighboring states who will have significant influence on the Commonwealth's policy decisions. The decisions thus become much more complex, in that the desired objectives of an individual state may go totally unheeded if the desires of an adjacent state look more palatable to the developers.

Regional coordination and cooperation become imperative. If the New England states enter into a competitive bidding war to attract OCS development, the region will be a substantial loser. Already there are dangerous indications that we are heading in this direction. Rhode Island and New Hampshire are actively seeking onshore petroleum development, and only Connecticut is advocating regional coordination. Thus as we analyze potential development opportunities in Massachusetts, we should not lose sight of the broader regional implications and the need for regional coordination.

The questions to be answered regarding onshore support industry for OCS development are basically seven.

Who are the developers?

Contrary to common opinion, they are not necessarily major oil companies. Most of the majors contract with other companies whose only purpose is to drill. These drilling contractors depend, in turn, on other onshore logistical support companies.

An offshore rig is similar to an island and is totally dependant on logistical support onshore. Aside from supplying basic drilling necessities such as piping, special drilling fluids, and a large amount of fresh water, they also supply everything from marine engineering consultants to food caterers.

What is this development?

To envision the extent of logistical support development for this region is a tricky question. After speaking with petroleum industrial people, and even taking into account the most recent federal report decreasing Atlantic offshore resource estimations by some 80 percent, we believe that there will either be significant petroleum resources on the Georges Bank and off the mid-Atlantic, or there will be no oil and gas at all. Federal reports have been very conservative historically, and the petroleum interests are still very optimistic. Even though no one will know if there is a drop of oil or gas until exploratory wells are sunk, our estimate is that we are still talking in the realm of a two billion barrel potential on the Bank and something similar for the mid-Atlantic.

We are bringing the mid-Atlantic into the picture because the northern portion of this region also lies in very close proximity to northern New England, making it possible for onshore support industries based in southern New England to support rigs for both resource areas. The support industry knows this, and we should therefore keep in mind that our employment figures could be multiplied by a factor of approximately 1.5. It should also be kept in mind that no one site alone will support both areas, or even one resource area.

We believe that it is safe to say that the initial exploration effort for the Georges Bank could be approximately six rigs; three to explore for oil and three for gas. When a lease sale is held for this area, sometime in late 1976, then rigs will be towed from the Gulf region. The onshore logistical support for these rigs will have already been developed. (This industry will probably make its decision on where to site its onshore facilities in early to mid-1976.)

It is our estimation that the facilities initially developed will be for the six rigs alone. However, we predict that the support industry will take out options to buy industrial land, exceeding the requirements to supply these six rigs. If exploration is successful, development will require a far greater logistical support effort.

To supply the initial exploration effort, we might envision a capital investment of around $50 million. Each rig requires approximately 200 total skilled laborers, 90 percent of which will be new to the region because of their specific job skills. We are therefore talking about 1200 new personnel, and with induced/ indirect employment, a total figure of up to 1500 jobs. Of these possibly only one-quarter would be present residents. Again, these figures are for the "initial" development.

Special bulk supplies, such as tubular goods, would be transported to the region via ship or rail, and possibly railed to the support site. Costs and safety require that the support site be as close to the actual drilling effort as possible.

Harborage areas will be in prime demand. Each exploration rig requires 2-3 supply boats, up to around 150 feet in length, requiring a draft of 17 feet. A dozen or so of these boats will be imported during the exploration phase and will require harbor facilities.

Much of the personnel and some equipment will be transported via helicopter, and with the 100 mile distance to drill sites, some heliport development will occur to accommodate six or eight helicopters.

To capsule the development of support industry to rigs off New England for the years 1976-79; we can expect a fairly simple effort, requiring a small amount of coastal industrial acreage (50 acres), approximately 1500 new personnel, a miniscule increase in regional employment, but a larger effort to obtain options for future coastal land development.

OCS onshore industry for production will under no circumstances begin for another 4-5 years. It is even more difficult to draw one scenario for such development due to the number of variables involved. The two major variables are when and how much offshore petroleum is found.

The following table describes a possible case where six billion barrels of petroleum are discovered within three years. It could, however, just as well take five or six years, and the resource may be considerably smaller. No one knows. However, based on the new U. S. Geological Survey estimates , we believe the effort will be slower than that depicted in the table, at least for the first few years.

OFFSHORE OIL DEVELOPMENT REGIONAL FIGURES FOR THE GEORGES BANK

(BASED ON SIX BILLION BARRELS)

	After 1982	1987	1992
TOTAL ANNUAL EMPLOYMENT	5,400	8,800	17,800
WAGES (MILLIONS)	$79	$120	$ 220
POPULATION INCREASE	6,600	9,200	12,300

* ALL FIGURES ARE FOR DIRECT, INDIRECT, AND INDUCED EMPLOYMENT

TOTAL DIRECT EMPLOYMENT

	1982	1987	1992
RIG PERSONNEL	640	640	1,120
WORKBOAT PERSONNEL	336	427	632
TUGBOAT PERSONNEL	42	70	70
CREWBOAT PERSONNEL	40	62	114
HELICOPTER PERSONNEL	22	32	72
PLATFORM DRILLING DEVELOPMENT PERSONNEL	1,800	2,430	3,060
PRODUCTION PLATFORM PERSONNEL	64	528	1,856
BARGE PLATFORM PERSONNEL	375	625	625
TOTAL:	3,319	4,814	7,559

1. These are New England figures.
2. Most of the employment factored in to the 1982 scenario will occur between 1980-1982. Initial employment, during exploration, would be substantially lower.
3. The percentage of local residents employed would be higher in the production stage than in the earlier stages.

We have stressed the possibility of industry's looking at options on land in the exploration period, exceeding their needs in order to have the ability to expand their site to include production platforms and rig fabrication sites as well as large material storage facilities if and when oil or gas is found. Should this occur, then we are talking about options of at least 500 acres. Brown and Root, Inc., are already using 200-300 acres of land on a 2000 acre option for this purpose in Virginia.

A small construction site of this nature (18,000 tons of steel a year) would have an annual employment of 1650 total.

employment breakdown	300	welders
	450	shipfitters
	450	skilled machinists, electricians, etc.
	300	general support laborers
	150	management
	1650	

Total direct, indirect, and induced labor would be 2600 jobs, with total annual wages of $40 million. Most jobs (80 percent) would be filled by present residents.

For what are the developers looking?

To accommodate the supplies immediately needed and the potential of rig repair sites and even possible production platform and rig fabrications, support industry will be looking to fill four requirements.

1) Level land adjacent to a good harbor. The initial effort would only require twenty to fifty acres, to be expanded

possibly into a thousand if oil or gas is found. Areas should be industrially zoned and as close to the resource sites as possible.

2) They are looking for a transportation infrastructure to accommodate ships for importing special heavy supplies, rail for delivery if needed, and if possible, an airport for both.

3) They are looking for sites in which they will not have to battle political opposition.

4) They are looking for sites in an industrial package whereby the state will offer additional municipal services. In this regard they also consider the tax base of the local community and the state.

The economic benefits to the state during exploration would be minimal unless the state undertook a substantial vocational training program, possibly subsidized by the industry, in the impacted communities. These programs would have to be developed immediately.

The major benefit during exploration would be the initiation of a petroleum infrastructure, which would have the potential to increase substantially. This is most important when looking down the road at refineries, deepwater ports, etc. The major point is that the initial development provides the potential for a much larger labor-intensive effort and establishes a base for the develop of an oil infrastructure. Additionally, the petroleum industry is fairly high-paying and would create indirect and induced employment.

What are the cost/benefits to Massachusetts if development should occur here?

The overall costs to the state are small, with one exception; and the costs to local communities could be substantial.

The one cost to the state would be a conflict with the indigenous fishing industry now seeking a comeback via the 200-mile economic zone legislation. The conflict would stem from multiple uses of harborage areas. But these are only possibilities and would exist five to ten years down the road; if at all. Still, they must be considered.

Local communities would bear the major share of costs, especially municipal service costs, but these would be minimal until the production stage. During exploration, costs would be minimal, because the influx of people would be dissipated among already urbanized areas.

In the development stage (1980-1990), the potential economic benefits will increase substantially. However, their impact will be extremely localized. In very simple terms, OCS development could be an economic bonanza for New Bedford, but it certainly will not turn Massachusetts around. For example, if you take the most optimistic figures possible for OCS development in New England, you are talking about no more than 20,000 jobs--at least half of these will be non-residents, and at least one-quarter of the total jobs will be in neighboring states. This means we are talking about at most 7500 jobs for Massachusetts citizens by 1990, and this is an exceedingly optimistic prediction.

Where would we want it?

The three possible site locations to feasibly consider as accommodating certain aspects of logistical support development in Massachusetts are New Bedford, Fall River, and Boston. All three areas require site specific analysis.

New Bedford:

This might possibly be the ideal site for locating OCS support industry. It has good harbor capabilities and lies in close proximity to the Georges Bank and the northern section of the mid-Atlantic resource area. It is an economically depressed area of high unemployment. An airport is also nearby.

Fall River:

This might be a less ideal site in terms of not having an open ocean location, but it might be more logical because of its existing petroleum receiving facilities, superceding New Bedford by a factor of ten. An existing receiving capacity might be viewed by the industry as being more beneficial, not only in the long run, but also in supplying ships and rigs with fuel. This area is also economically depressed with high unemployment and could utilize the airport in New Bedford.

Boston:

Boston possesses an underutilized port of excellent capacity and is adjacent to a large airport. Negative is the fact that it is located farther away from the estimated primary areas of OCS development. It may have navigational hazards for supply boats operating on a 24-hour day. However, it does contain heavy equipment handling facilities and has a ready labor supply.

How can we best attract development?

We should follow the Northeast Scotland Development Authority's process of "offering" industrially zoned packages. We should not follow the piecemeal public relations approach. We must find out what the substantial needs of the industry are. Then we must determine what we have to offer to meet these needs. Then we can verify what the best site(s) would be.

The site package must include land that is industrially zoned. We must describe all existing facilities and those to which the state or the municipality would construct, or at least would construct under a joint venture with the industry. We should detail such parameters as municipal services, housing and personnel availability, material resources, tax bases, and all applicable environmental statutes. In other words, trim off negative suspicions and erroneous assumptions, and we enhance our chances of attracting development. State economic planners should develop this package. This will be difficult, but we would take this burden off the industry, and thus convince them that they would not be tied up in court battles.

What course should we now pursue?

First, we would like to note that the City of Camden, New Jersey, has contracted a consulting firm (VTN, Cambridge, Mass.) to put together a package to attract logistical support industry for a mid-Atlantic OCS development. The initial 90-day contract for $100,000 is for a preliminary package presentation in early fall. A larger contract to the same company will entail details for negotiation with the support industry.

We would also note that Massachusetts should continue to seek approval for OCS impact compensation. If we should develop a package, we would like to offer as many services as possible. We could subsequently claim these services as our incurred OCS impact cost, becoming eligible for federal compensation, if provided.

With the existing expertise in Massachusetts state government, we do not believe we would necessarily have to go the outside consultant route. If we must, then we should seek federal funds for that purpose. The tasks described for attracting development could be undertaken through a coordinated effort by the Executive Offices of Consumer Affairs, Communities and Development, Economic Affairs, and Environmental Affairs; and the Office of State Planning. The time to develop a comprehensive package is the rest of this year, and the decision to pursue this course should be made as soon as possible.

Concurrent with this package, we must look into establishing vocational training programs for local residents to acquire the skills needed for petroleum development. This would entail communication with the industry and federal government for possible subsidization.

State officials should meet with the Regional Planning Agencies in southeastern Massachusetts to discuss coordination of industrial zoning between local authorities.

Finally, a mechanism for disclosure of intent to develop should be devised so that we know where, when, and what is happening in each local community in order to be aware of the whole picture. This mechanism might be involved through license or permit application as prerequisite to obtaining development rights and/or options.

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